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Application No.: 10/079,400

Docket No.: S3100.0005

TECHNOLOGY CENTER R3700

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A punching device, comprising:
  - a main stand, to which is fixed a die which is provided with a die hole in its upper surface;
  - a table, which is provided so as to be shiftable with respect to said main stand, which is formed with a hole approximately in its central portion for exposing said die, and which further is made so that a workpiece ~~can be mounted~~ is mountable upon its upper surface;
  - a shift mechanism which shifts said table with respect to said main stand;
  - a raising and lowering mechanism which is arranged above said table and raises and lowers a punch plate to which is fitted a punch which ~~can be engaged~~ is engageable into said die hole;
  - a first photographic device, which is fixed in a position removed from ~~[[the]]~~ a raising and lowering track of said punch plate, and which photographs a first image which shows ~~[[the]]~~ a position of said die hole in said die, and a second image which shows ~~[[the]]~~ a position of a pattern which indicates the position upon said workpiece which is to be punched; and
  - a shifting control means which controls said shift mechanism according to said first and second images which are photographed by said first photographic device, so as, by shifting said table, to align ~~[[the]]~~ a position of said pattern which indicates the position upon said workpiece which is to be punched to the position of said die hole in said die.

2. (Currently Amended) The punching device of claim 1, further comprising:

a second photographic device which is fixed in a position removed from the raising and lowering track of said punch plate, and which photographs an image which shows [[the]] a position of said die hole in said die, and [[the]] a position of said pattern which shows [[the]] a position upon said workpiece which is to be punched; and

a monitor device which displays said image which is photographed by said second photographic device.

3. (Original) The punching device of claim 1, wherein a mirror is interposed in the optical path between said first photographic device and said table, and said first photographic device photographs said first image which shows the position of said die hole in said die, and said second image which shows the position of said pattern which shows the position upon said workpiece which is to be punched, via said mirror.

4. (Currently Amended) The punching device of claim 2, wherein a mirror is interposed in the optical path between said first photographic device and said table, and said first photographic device photographs said first image which shows [[the]] a position of said die hole in said die, and said second image which shows [[the]] a position of said pattern which shows [[the]] a position upon said workpiece which is to be punched, via said mirror.

5. (Original) The punching device of claim 1, wherein said shift mechanism shifts said table with respect to said main stand in two mutually perpendicular directions in a horizontal plane.

6. (Original) The punching device of claim 2, wherein said shift mechanism shifts said table with respect to said main stand in two mutually perpendicular directions in a horizontal plane.

7. (Original) The punching device of claim 3, wherein said shift mechanism shifts said table with respect to said main stand in two mutually perpendicular directions in a horizontal plane.

8. (Original) The punching device of claim 4, wherein said shift mechanism shifts said table with respect to said main stand in two mutually perpendicular directions in a horizontal plane.

9. (Original) The punching device of claim 5, wherein said shift mechanism further rotates said table with respect to said main stand within said horizontal plane around a vertical axis.

10. (Original) The punching device of claim 6, wherein said shift mechanism further rotates said table with respect to said main stand within said horizontal plane around a vertical axis.

11. (Original) The punching device of claim 7, wherein said shift mechanism further rotates said table with respect to said main stand within said horizontal plane around a vertical axis.

12. (Original) The punching device of claim 8, wherein said shift mechanism further rotates said table with respect to said main stand within said horizontal plane around a vertical axis.

13. (Canceled)

14. (Original) A workpiece processing method in which a workpiece is subjected to a punching process using a punching device which comprises: a main stand to which is fixed a die which is provided with a die hole in its upper surface; a table which is provided so as to be shiftable with respect to said main stand, which is formed with a hole approximately in its central portion for exposing said die, and which further is made so that a workpiece can be mounted upon its upper surface; and a raising and lowering mechanism which is arranged above said table and raises and lowers a punch plate to which is fitted a punch which can be engaged into said die hole; comprising:

an insertion and fixing step of inserting said workpiece between said table and said punch plate and fixing it to said table, with said die being fixed to said main stand and being exposed through said hole in said table;

a step of photographing a first image which shows the position of said die hole in said die with a first photographic device which is fixed in a position removed from the raising and lowering track of said punch plate;

a step of, after fixing said workpiece, photographing with said first photographic device a second image which shows the position of a pattern which indicates the position upon said workpiece which is to be punched;

an alignment step of shifting said table according to said first and second images so as to align the position of said pattern which indicates the position upon said workpiece which is to be punched to the position of said die hole in said die; and

a punching step of, after said alignment step, lowering said punch plate which is fitted to said punch and punching said workpiece.

15. (Original) The workpiece processing method according to claim 14, wherein said insertion and fixing step comprises:

an insertion step of, while photographing an image which shows the position of said die hole in said die and the position of said pattern which shows the position upon said workpiece which is to be punched with a second photographic device which is fixed in a position removed from the raising and lowering track of said punch plate, inserting said workpiece and positioning it upon said table according to said photographic image; and

a fixing step of, after inserting said workpiece, fixing said inserted workpiece to said table.